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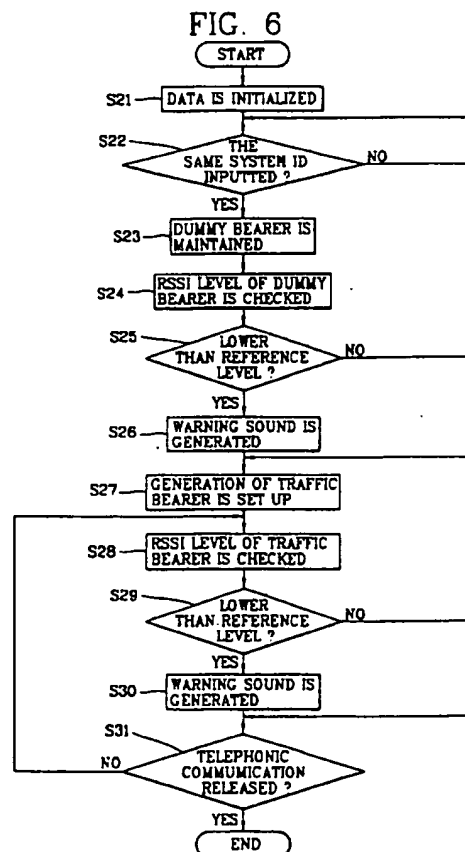
(58) Field of Search

UK CL (Edition R ) H4L LFMA LFMX  
INT CL<sup>7</sup> H04B 17/00 , H04Q 7/34  
Online: EPODOC, WPI, JAPIO

(54) Abstract Title

Measurement of cell coverage of DECT system

(57) An arrangement for determining cell coverage in a DECT system comprises a base station terminal which simulates a base station and a mobile station terminal for measuring RSSI and subsequently determining cell coverage. The base station simulator has an antenna with the same RF characteristics as an actual base station, and periodically broadcasts system information on a predetermined channel. A threshold RSSI is used in the mobile terminal to determine cell coverage.



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FIG. 1

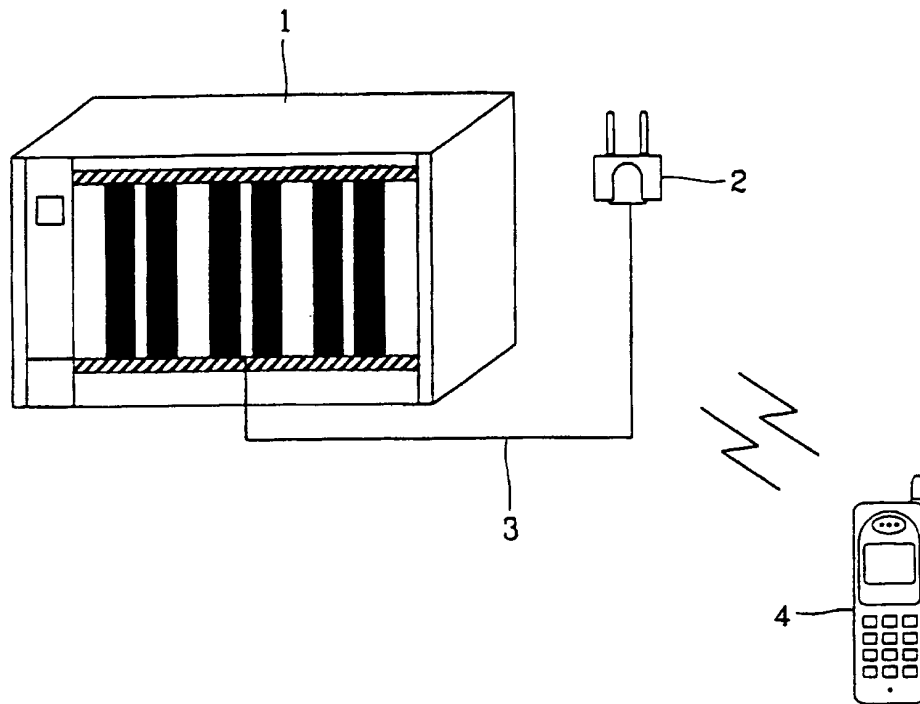


FIG. 2A

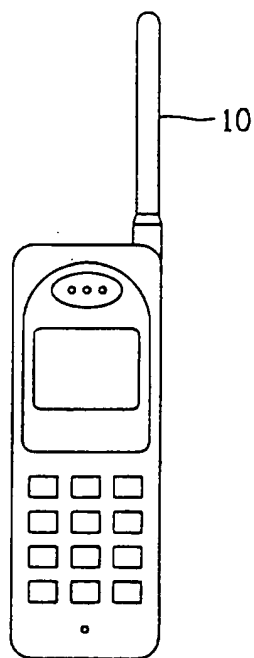


FIG. 2B

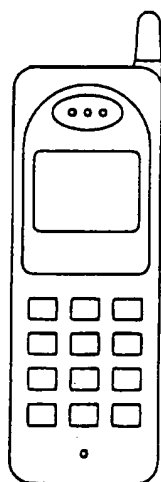


FIG. 3

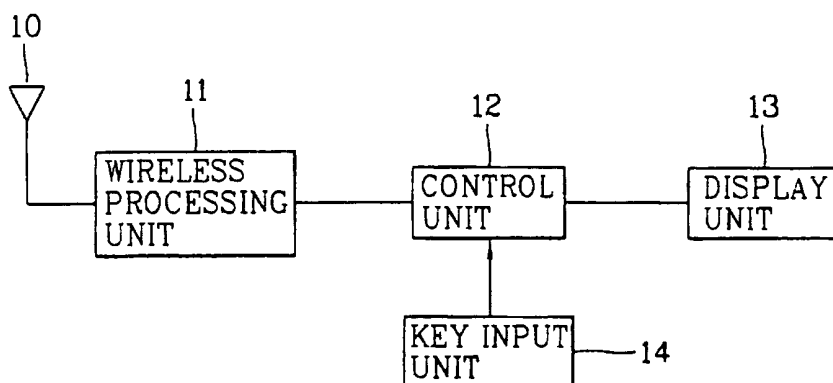


FIG. 4

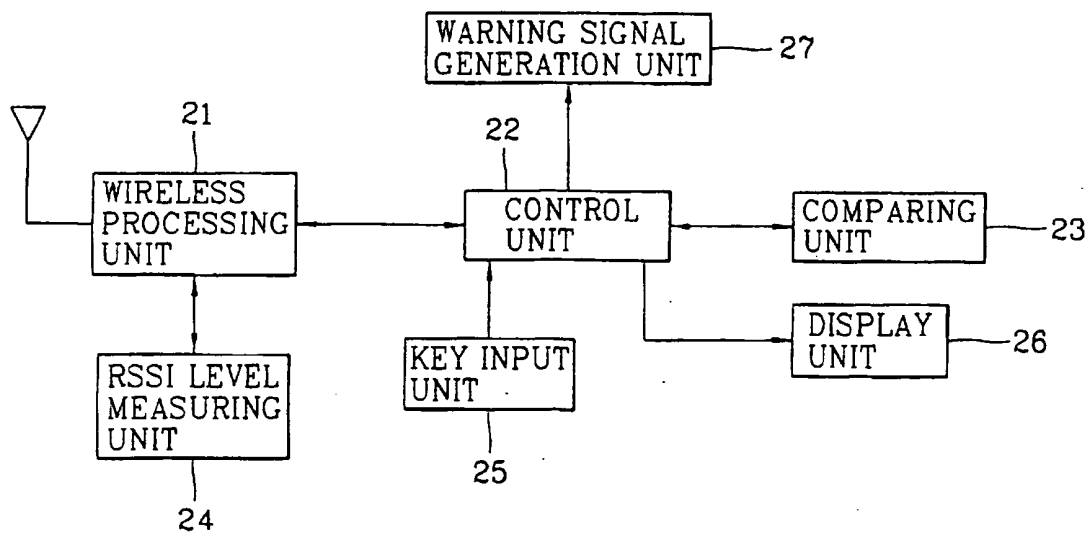


FIG. 5

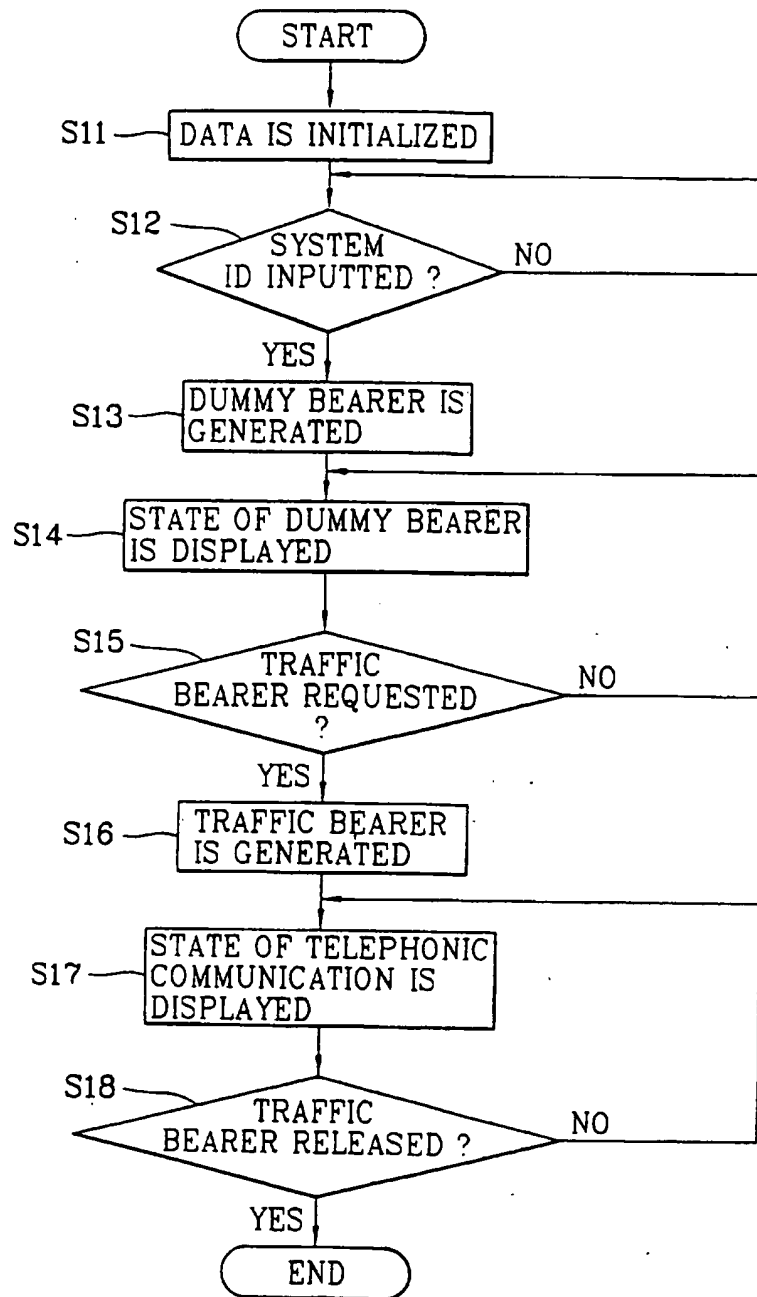
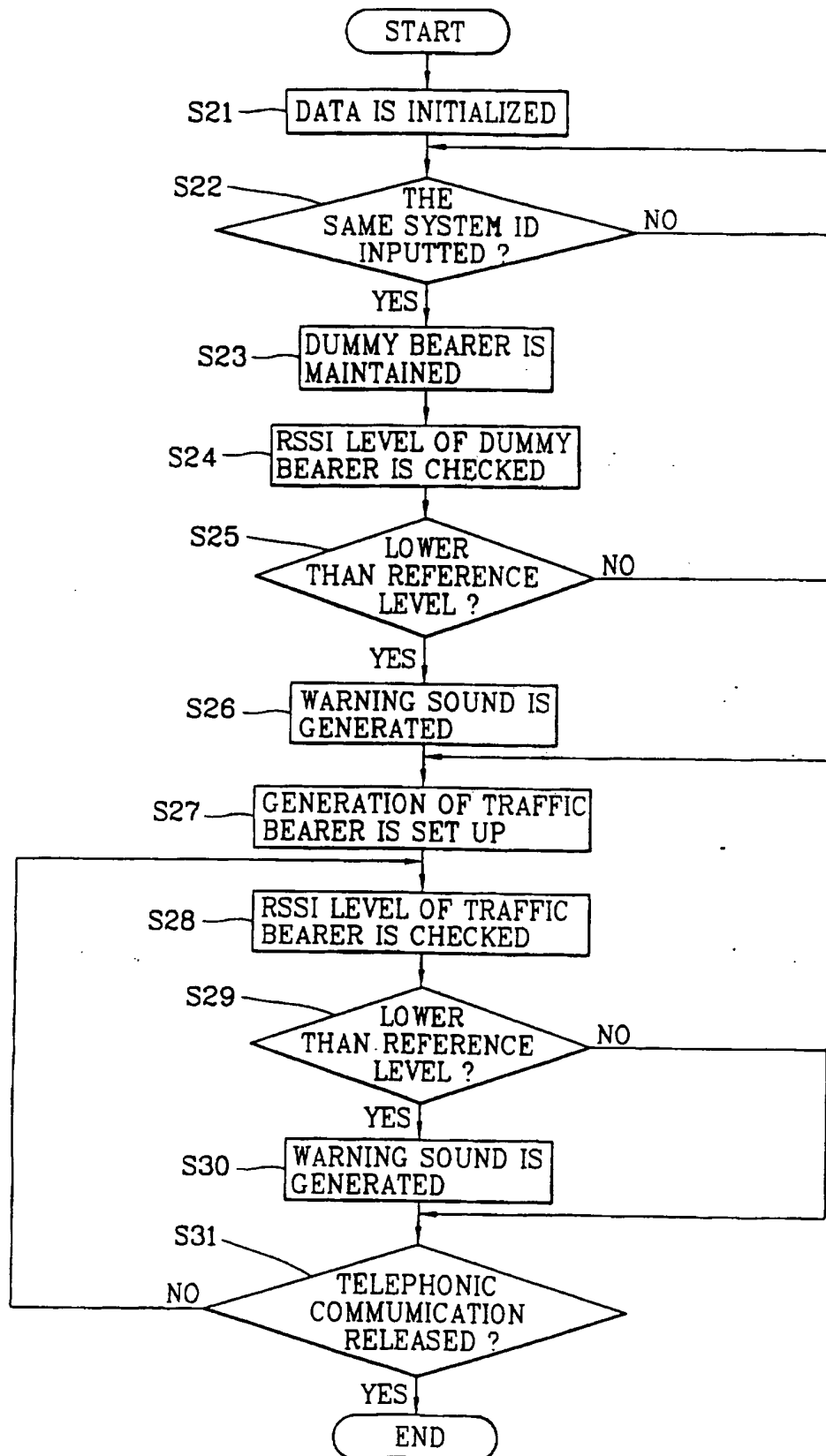


FIG. 6



APPARATUS AND METHOD FOR MEASURING CELL COVERAGE OF DECT  
SYSTEM

BACKGROUND OF THE INVENTION

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1. Field of the Invention

The present invention relates to a DECT (Digital Enhanced Cordless Telecommunication) system, and more particularly, to an apparatus for measuring a cell coverage of a DECT system, and to its method.

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2. Description of the Background Art

Figure 1 shows a general DECT system consisting of a base station 2, that is, a fixed part connected to a main system 1, and a wireless handset 4, that is, a portable part performing a communication wirelessly through the base station

15 2.

In such a DECT system, the base station 2 typically forms a single cell within which the handset 4 and a network can be connected in a pre-set frequency band. Accordingly, it is very important in designing the DECT system to measure a cell coverage of a single base station 2 to install it in the most suitable position.

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For this purpose, in the conventional DECT system, a suitable place for installing the base station 2 is set in a manner that, first, a base station is installed at an arbitrary place, and a measuring instrument is carried on around the place to measure the strength of an RF signal radiated from the base station 2, or a direct communication is attempted through the handset 4 to identify the quality of sound,

25 and according to the result, the above process is repeatedly performed by moving

the base station 2 for finding a more suitable place therefor.

However, as to the method for measuring the cell coverage in accordance with the conventional art, since the main system 1 and the base station 2 are connected by wire 3, it is quite inconvenient to move the base station by positions  
5 for setting the cell coverage, and the measuring instrument is very expensive. Moreover, since the measuring instrument is quite heavy, it is not easy to carry on for measurement.

#### SUMMARY OF THE INVENTION

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Therefore, an object of the present invention is to provide an apparatus for measuring a cell coverage of a DECT system including a wireless handy fixing part adapting an antenna having the same wireless characteristics as an existing base station by using an existing wireless handset device and a moving part  
15 programmed for measuring a cell coverage, thereby facilitating a position movement for measuring the cell coverage, and its method.

To achieve these and other advantages and in accordance with the purposed of the present invention, as embodied and broadly described herein, there is provided a method for measuring a cell coverage in a DECT (digital  
20 enhanced cordless telecommunication) system, including the steps of: forming a dummy bearer between the base station terminal having an antenna with the same RF characteristics as that of an actual base station and periodically broadcasting system information through a predetermined channel and a mobile station terminal measuring an RSSI (received signal strength indicator) level of a  
25 signal inputted from the base station terminal and judging a cell coverage of a



corresponding base station, so as to measure an RSSI level of the dummy bearer;  
forming a traffic bearer between the base station terminal and the mobile station  
terminal so as to measure an RSSI level of the traffic bearer; and respectively  
comparing the measured value of RSSI levels of the dummy bearer and the traffic  
5 bearer with pre-set reference values and judging a cell coverage of a  
corresponding base station.

## BRIEF DESCRIPTION OF THE DRAWINGS

10 The accompanying drawings, which are included to provide a further  
understanding of the invention and are incorporated in and constitute a part of this  
specification, illustrate embodiments of the invention and together with the  
description serve to explain the principles of the invention.

In the drawings:

15 Figure 1 is a schematic view of a structure of a DECT system in  
accordance with a conventional art;

Figures 2A and 2B show an external form of a measuring instrument for a  
cell coverage in accordance with the present invention;

Figure 3 is a schematic block diagram of a base station terminal of Figure  
20 2A in accordance with the present invention;

Figure 4 is a schematic block diagram of a mobile station terminal of  
Figure 2B in accordance with the present invention;

Figure 5 is a flow chart of a process of measuring the cell coverage with  
respect to a base station terminal of Figure 2A in accordance with the present  
25 invention; and

Figure 6 is a flow chart of a process of measuring the cell coverage with respect to a mobile station terminal of Figure 2B in accordance with the present invention.

## 5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

Figures 2A and 2B show an external form of a measuring instrument for a cell coverage in accordance with the present invention, of which Figure 2A illustrates a base station terminal serving as a fixing part such as a base station, and Figure 2B illustrates a mobile station terminal serving as a portable part such as a wireless handset.

As shown in the drawings, in the present invention the base station terminal and the mobile station terminal use the same outer casing form as that of a wireless handset used in the existing DECT system, and the base station terminal is provided with an antenna 10 having the same wireless characteristics as that of the base station in the existing DECT system so as to generate a signal of the same characteristics as that of an actual base station.

Figure 3 is a schematic block diagram of a base station terminal of Figure 2A in accordance with the present invention, and Figure 4 is a schematic block diagram of a mobile station terminal of Figure 2B in accordance with the present invention.

As shown in the drawings, the base station terminal includes a key input unit 14 for inputting a predetermined system ID; a wireless processing unit 11 for

broadcasting system information having the system ID via the antenna 10; a display unit 13 for displaying the content processed by the wireless processing unit 11; and a control unit 12 programmed to control each block.

The mobile station terminal includes a wireless processing unit 21 for a  
5 wireless data transmitted and received to and from the base station terminal; a key input unit 25 for inputting the same system ID as that of the base station terminal; an RSSI level measuring unit 23 for measuring an RSSI level of a signal inputted from the base station terminal; a comparing unit 24 for comparing the RSSI value measured by the RSSI level measuring unit and a pre-set RSSI reference value; a  
10 display unit 26 for displaying the comparison result of the comparing unit 24; and a control unit 22 for controlling each block.

The base station terminal serves as a fixing part having the same wireless characteristics as an actual wired base station in the DECT system. Accordingly, the base station terminal periodically broadcasts its own system ID, a system  
15 capacity and a state of channel use according to a DECT protocol through the dummy bearer, and generates a traffic bearer in case that there is a request for the traffic bearer from the mobile station terminal.

Meanwhile, the mobile station terminal performs a function of a portable part of the DECT system. It is synchronized with the base station terminal and  
20 checks the RSSI level through the dummy bearer and displays it, or compares the RSSI level with a pre-set reference value to accordingly output a proper signal. Or, in order to measure an actual communication quality, it requests the base station terminal to generate a traffic bearer, so as to measure the RSSI level of the traffic bearer.

25 In this respect, the RSSI value provides the basis for judgement of a cell

coverage of the base station terminal (base station).

The operation of the base station terminal and the mobile station terminals according to the present invention constructed as described above will now be explained with reference to Figures 5 and 6.

5           Figure 5 is a flow chart of a process of measuring the cell coverage with respect to a base station terminal of Figure 2A in accordance with the present invention, and Figure 6 is a flow chart of a process of measuring the cell coverage with respect to a mobile station terminal of Figure 2B in accordance with the present invention.

10           First, referring to the base station terminal, when a proper system ID is inputted through a key input unit 14, the control unit 12 selects pre-set specific frequency and slot and requests the wireless processing unit 11 to form a dummy bearer in a corresponding slot in steps S11 and S12.

          Accordingly, the wireless processing unit 11 forms a dummy bearer in the  
15   corresponding channel and transfers its result to the control unit 12. Then, the control unit 12 transfers the system information including the system ID to the wireless processing unit 11 through a corresponding dummy bearer, so that the system ID can be broadcast wirelessly in a step S13.

          When broadcasting is normally started, the control unit 12 displays the  
20   frequency and the slot that are currently being broadcast on the display unit 13 so that the user can be aware of it in a step S14.

          Meanwhile, in case that there is a request for setting a traffic bearer from the mobile station terminal, the wireless processing unit 11 of the base station terminal periodically performing scanning for the ten DECT frequencies in turn,  
25   and transfers the scanned data to the control unit 12.

When a traffic bearer set-up request data of the mobile station terminal is detected in the scanned frequency and slot, the control unit 12 forms a traffic bearer in the requested specific frequency and slot, and notifies the mobile station terminal of it in steps S15 and S16.

5           And, the control unit 12 of the base station terminal displays the state of the traffic bearer as formed for the user's notification, and releases the traffic bearer according to a request for releasing the traffic bearer in steps S17 and S18.

The operation of the mobile station terminal will now be described.

First, when the same system ID as that of the base station terminal is  
10   inputted through the key input unit 25, the control unit 22 requests RSSI values of each slot of all signals for the ten DECT frequencies from the wireless processing unit 21.

According to the request from the control unit 22, the wireless processing  
unit 21 drives the RSSI measuring unit 24 to measure RSSI values of all slots per  
15   frequency and transfers them to the control unit 22.

Then, the control unit 22 makes a list of the RSSI values as inputted from the wireless processing unit 21 and selects a frequency and a slot of a channel for maintaining synchronization according to the order in the list. And then, it transfers the corresponding frequency and slot to the wireless processing unit 21 in turn so  
20   as to receive the system data broadcast by the base station terminal in steps S21 and S22.

When the control unit 22 finds out the frequency and the slot to which the same system ID as that of the base station terminal desired to maintain a synchronization among the system data transferred from the wireless processing  
25   unit 21 is received, it requests the wireless processing unit 21 to maintain the

synchronization for the corresponding frequency and the slot and continuously requests an RSSI value of the corresponding frequency and slot in steps S23 and S24.

And, the control unit 22 controls in a manner that the measured RSSI data  
5 is displayed on the display unit 26 for the user's notification or controls the comparing unit 23 so that the RSSI reference value as inputted by the user and the measured RSSI value are compared, and if the latter is lower than the former, a warning sound is generated by a warning signal generation unit 27 in steps S25 and S26.

10 Meanwhile, in case of testing the traffic channel, the wireless processing unit 21 drives the RSSI measuring unit 24 to measure the RSSI values for the all slots per the DECT frequency for the traffic bearer and transfers them to the control unit 22.

Then, the control unit 22 makes a list of the RSSI values inputted from the  
15 wireless processing unit 21, selects a frequency and a slot desired to form a traffic bearer according to the order in the list, and transfers the corresponding frequency and slot to the wireless processing unit 24 in turn.

Accordingly, the wireless processing unit 24 requests a traffic bearer from the base station terminal, and as the base station terminal allows it, the wireless  
20 processing unit 24 transfers its result to the control unit 22.

As the traffic bearer is formed, the control unit 22 continually requests the RSSI value of the traffic bearer from the wireless processing unit 21, and displays its result on the display unit 27 for the user's notification in steps S27 and S28.

The pre-set RSSI reference value for the traffic bearer and the measured  
25 RSSI value are compared to each other by the comparing unit 23, and if the result

is lower than the predetermined level, a warning sound is generated by the warning signal generation unit 27 and the communication is released in steps S29, S30 and S31.

Referring to the outputting of the comparison result in the steps S26 or in the step S30, an LED may be used for user's notification instead of the warning sound.

As so far described, the present invention includes a base station terminal having the same wireless characteristics as that of the base station, in place of it, that is wire-connected to the main equipment in order to measure the cell coverage, and a mobile station terminal that forms the dummy bearer and the traffic bearer with respect to the base station terminal and checks the RSSI level of the dummy bearer and the traffic bearer to thereby measure the cell coverage of the corresponding base station, thereby measuring the cell coverage more quickly and easily than in the cell planning, for cell designing.

In addition, since the base station terminal and the mobile station terminal use the same outer casing and battery as the wireless handset that is used in the existing DECT system, there is no need for fabricating an additional cell coverage measuring instrument, so that the cell coverage can be easily designed and its expense can be cut down on.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds

of the claims, or equivalence of such meets and bounds are therefore intended to be embraced by the appended claims.



What is claimed is:

1. An apparatus for measuring a cell coverage in a DECT (digital enhanced cordless telecommunication) system, comprising:

5 a base station terminal having an antenna having the same RF characteristics as that of an actual base station and periodically broadcasting system information through a predetermined channel; and

a mobile station terminal for measuring an RSSI (received signal strength indicator) level of an input signal and judging a cell coverage of a corresponding  
10 base station.

2. The apparatus according to claim 1, wherein the base station terminal has its own distinctive system ID against other system.

15 3. The apparatus according to claim 1, wherein the base station terminal includes:

a key input unit for inputting a system ID;

wireless processing unit for broadcasting the system information including the system ID through the antenna;

20 a display unit for displaying the processing content by the wireless processing unit; and

a control unit programmed to control each block.

4. The apparatus according to claim 1, wherein the mobile station  
25 terminal includes:

a key input unit for inputting the same system ID as that of the base station terminal;

an RSSI level measuring unit for measuring an RSSI level of a signal inputted from the base station terminal;

5 a comparing unit for comparing the RSSI value measured by the RSSI level measuring unit and a pre-set RSSI reference value;

a display unit for displaying the comparison result of the comparing unit; and

a control unit for controlling each block.

10

5. The apparatus according to claim 4, wherein the mobile station terminal further includes a warning signal generation unit for outputting the comparison result of the comparing unit as a warning sound or LED(Light Emitting Diode).

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6. A method for measuring a cell coverage in a DECT (digital enhanced cordless telecommunication) system including a base station terminal having an antenna with the same RF characteristics as that of an actual base station and periodically broadcasting system information through a dummy bearer and a mobile station terminal for measuring an RSSI (received signal strength indicator) level of a signal inputted from the base station terminal to judge a cell coverage of a corresponding base station, comprising the steps of:

forming a dummy bearer between the base station terminal and the mobile station terminal;

25 measuring an RSSI level of the dummy bearer; and

comparing the measured RSSI value and a pre-set reference value and accordingly judging a cell coverage of a corresponding base station.

7. The method according to claim 6, wherein the step for forming the  
5 dummy bearer between the base station terminal and the mobile station terminal includes the sub-steps of:

inputting a specific system ID to the base station terminal;

broadcasting system information including the system ID through the dummy bearer in the base station terminal;

10 displaying a transfer slot and a frequency of the dummy bearer; and

inputting the same system ID as that of the base station terminal to the mobile station terminal so as to form a dummy bearer.

8. The method according to claim 6, further includes a step for  
15 comparing the measured RSSI value of the mobile station terminal and a predetermined RSSI reference value and outputting the comparison result as a warning sound or LED.

9. The method according to claim 6, further includes the steps of:  
20 forming a traffic channel between the base station terminal and the mobile station terminal and measuring an RSSI value of the traffic channel for measurement of an actual communication quality; and  
displaying the measured result.

25 10. The method according to claim 9, further includes a step for

comparing the measured RSSI value of the traffic channel of the mobile station terminal and a predetermined traffic channel RSSI reference value and outputting its result as a predetermined warning sound or as an LED signal.

- 5           11.     A method for measuring a cell coverage in a DECT (digital enhanced cordless telecommunication) system including a base station terminal having an antenna with the same RF characteristics as that of an actual base station and periodically broadcasting system information through a predetermined channel and a mobile station terminal for measuring an RSSI (received signal
- 10   strength indicator) level of an signal inputted from the base station terminal to judge a cell coverage of a corresponding base station, comprising the steps of:
- forming a dummy bearer between the base station terminal and the mobile station terminal and measuring an RSSI level of the dummy bearer;
- forming a traffic bearer between the base station terminal and the mobile
- 15   station terminal and measuring an RSSI level of the dummy bearer; and
- respectively comparing the measured value of RSSI levels of the dummy bearer and the traffic bearer and a pre-set reference value and judging a cell coverage of a corresponding base station.

- 20           12.     The method according to claim 11, wherein the step for judging the cell coverage includes a sub-step for outputting a warning sound or an LED signal in case that the measured RSSI value of the dummy bearer and the traffic bearer is a level causing a disturbance for a communication quality.



Application No: GB 9930752.2  
Claims searched: 1 to 12

Examiner: Glyn Hughes  
Date of search: 4 July 2000

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.R): H4L (LFMA, LFMX)  
Int CI (Ed.7): H04B 17/00, H04Q 7/34  
Other: Online: WPI, JAPIO, EPODOC

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2166325 A (PHILIPS) see whole document	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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